

# **3M 820 Wet- Reflective Tape on SR-6 & I-215**

## **Interim Report**

**Experimental Feature X(02)12 – New Products**

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## Introduction

Pavement markings continue to be a developing field in transportation. The most challenging property of pavement marking is its ability to provide delineation during wet-night conditions. Although Utah is the second driest State in the Union, wet-night reflectivity can be a concern. UDOT's Traffic and Safety Division identified 2 such locations; US-6 near Soldier Summit and I-215 (300 East to 1300 East).

UDOT's Traffic and Safety Division along with the local maintenance division decided to install 3M's wet-reflective tape on these two locations. The section on US-6 was installed in August 2003 and the section on I-215 was installed in September 2003. UDOT's Research Division has been asked to monitor these sections for durability, retro-reflectivity, and wet-night retro-reflectivity. This study will last three years and interim reports will be written each fall and spring.

## Background Information

This 8-mile stretch of US-6 is primarily a three-lane (two EB, one WB) highway (see Figure 1), however it constricts to a two-lane highway at the beginning and end of the section.



Figure 1-Typical Section of US-6 (Heading WB)

Interstate 215 is the belt route of Salt Lake City. At the test section location, the road is a six-lane divided interstate (see Figure 2).



**Figure 2-Typical I-215 section**

Table 1 gives the properties of each section of this Experimental Feature.

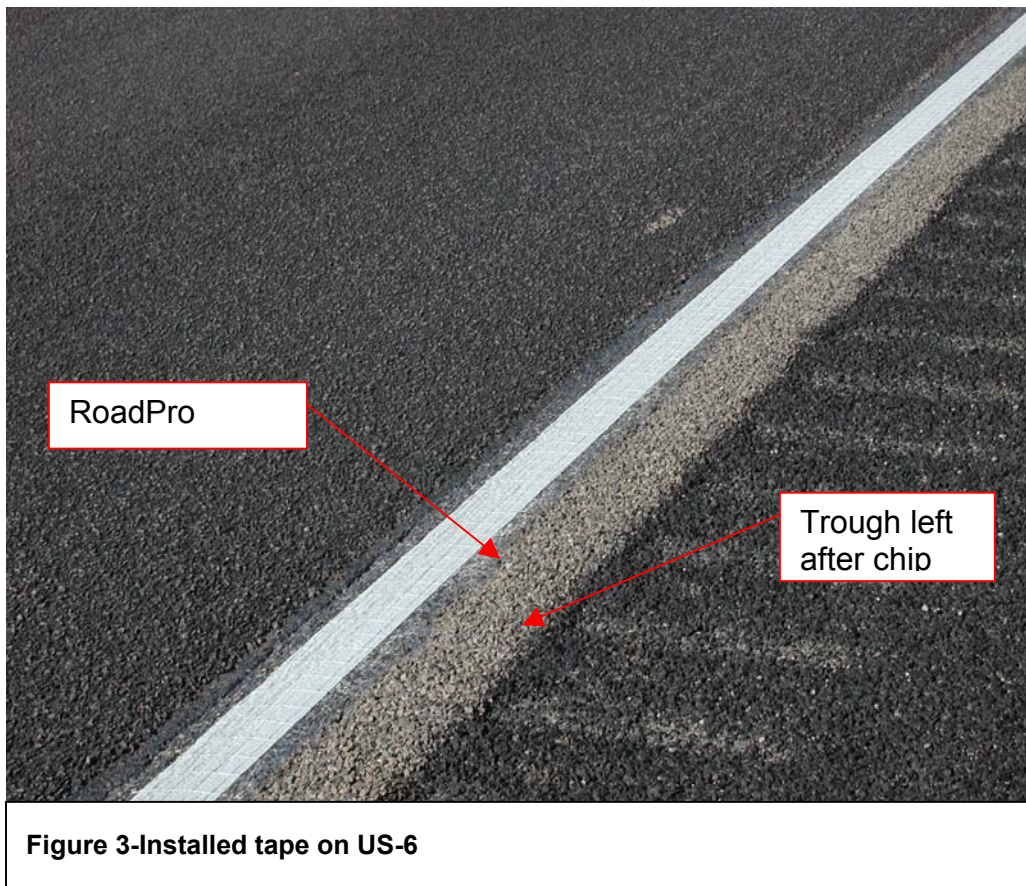
<b>Table 1</b>		
	<b>US-6</b>	<b>I-215</b>
AADT	6,855	116,251 - 58,000 Each Direction
Material	PG Asphalt	PCCP
Elevation	1,900m - 2,250 m	1,300 m

## **Construction Information**

Both installations required the product to be placed below the profile of the road. For the US-6 project this was accomplished in two ways. First, a chip seal was

placed over the existing asphalt surface, but the oil sprayers were turned off over the tape location. This allowed the excess chips to be swept away and a trough was left where the tape was going to be placed. Then, a Roadpro asphalt grinder was used to increase the depth of the inlay and to make a more precise groove. The surface was then sprayed with the 3M primer, the paper backing removed, and the product placed. Compacting rollers were not used on this job; instead, a car wheel and a truck wheel were driven over the product to press it. Figure 3 shows the end product.

The SR-6 project included only the edgeline of the two-lane rural road. The I-215 project included both white edgeline, yellow edgeline, and skip lines.



## Goal

The goal of this project was to determine the effectiveness of this tape.

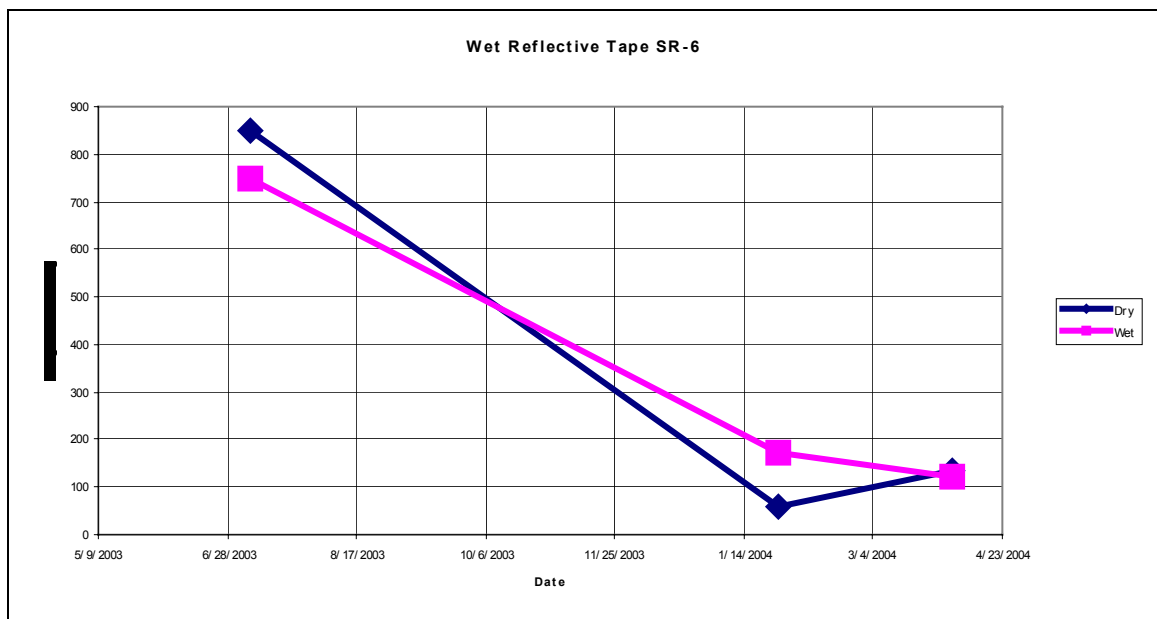
## Objectives

The objectives are:

1. Evaluate the retro-reflectivity over time ( $\text{mcd/m}^2/\text{lx}$ ).
2. Evaluate the durability over time.

## Results (U.S. 6)

1. The initial retro-reflectivity was very good. However, there was a large standard deviation in the data. The data shows a dramatic decline in the RR over the first season. The wet-night retro-reflectivity was measured using the LTL 2000 and showed good results.



The chart shows the dramatic decline. Interestingly, the values doubled or sometimes tripled if the retro-reflectivity was measured against the flow of traffic. This hasn't been explained, but may indicate the product is more sensitive to snow plow abrasion than other markings.

Retro-reflectivity readings have recently been taken on I-215 but had not yet been compiled and analyzed as of the writing of this report.

2. There was a major problem with the durability. In both locations there were major portions that came up. The total loss amounted to about 10% of the total project. The reason for the loss isn't yet known. Warranty work will be done to replace the failed tape.

3. Warranty work was performed by 3M and because the redo involved significant replacement at both sites the study was discontinued. Evaluating old and new is not practical and yields mixed results.

## **Results (I-215)**

The third set of retro-reflectivity readings have recently (July 2005) been taken on I-215 but had not yet been compiled and analyzed as of the writing of this report. The previous two sets of readings proved inconclusive as the failure curve could not be generated. However, the visual inspection shows good visibility under both wet and dry conditions.

## **Conclusions (U.S. 6)**

The tape on U.S. 6 lost its much of its RR after the first season. The product also suffered heavy loss in durability after the first season. However, subjective descriptions of the product during wet-night conditions were extremely positive indicating the product works under the conditions for which it is designed.

## **Conclusions (I-215)**

The tape on I-215 still is in place. The product will continue to be evaluated.

## **Recommendations**

At this time, the Research Division does not recommend using a foil backed wet reflective tape as it has yet to prove durable. 3M is currently working on a 380 series wet reflective tape which will be tested in Region Two in the Fall of 2005. Currently Materials, Central Maintenance, Traffic & Safety, Research and the Regions are working together to determine effective pavement markings for given conditions.